CLAIMS

I claim:

1. A method of fetal gene therapy comprising:

a) identifying a fetus with a genetic defect;

b) obtaining donor allantois or umbilical cord cells compatible with the fetus, wherein the cells express a gene product that ameliorates the genetic defect; and

c) exposing the fetus to the allantois cells of step (b), wherein a chimeric allantois/umbilical cord capable of supplying the gene product to the fetus is created.

2. The method of claim 1 wherein the donor cells are taken from the base of a donor allantois.

3. The method of claim 1 wherein step (c) comprises transplanting the cells to a region of the allantois/umbilical cord wherein an appropriate developmental environment is present.

4. The method of claim 1 wherein the allantois cells are taken from the mid-region of a donor allantois.

5. A method of gene therapy comprising

a) identifying a fetus with a genetic defect;

b) obtaining allantois cells compatible with the fetus, wherein the cells express a gene product that ameliorates the genetic defect; and

c) transplanting the allantois cells to the fetus, wherein the transplanted cells develop into endothelial cells which line the vasculature of the umbilical cord and release the gene product into the bloodstream of the fetus.

6. The method of claim 5 wherein the cells are taken from the mid-level of a donor allantois.

7. The method of claim 5 wherein the cells are taken from the base of a donor allantois.

8. The method of claim 5 wherein the cells are taken from a dissociated cultured donor allantois.

9. The method of claim 5 wherein the cells comprise a marker gene.

10. A method of fetal gene therapy comprising:

a) identifying a fetus with a genetic defect;

b) obtaining allantois or umbilical cord cells compatible with the fetus, wherein the cells express a gene product that ameliorates the genetic defect and wherein the cells are capable of colonizing a fetal organ; and

c) exposing the fetus to the cells of step (b), wherein a chimeric fetal organ capable of supplying the gene product to the fetus is created.

11. The method of claim 2 wherein the organ is liver.

12. The method of claim 2 wherein the method of exposure is microinjection into the fetal organ.

13. The method of claim 2, wherein the organ is the aorta.

14. A method of observing vasculogenesis comprising the steps of preparing an isolated allantois culture and observing vasculogenesis.

15. A transgenic allantois cell.

16. A method of delivering molecules to a fetus comprising:

a) obtaining donor allantois or umbilical cord cells compatible with a fetus, wherein the cells express a gene product; and

b) exposing the fetus to the cells of step (a), wherein a chimeric allantois/umbilical cord capable of supplying the gene product to the fetus is created.

17. A method of evaluating the effect of test compounds on blood vessel formation comprising the steps of:

a) applying the test compound to a cultured allantoic explant; and

b) observing the effect of the compound on vasculogenesis in the allantoic explant.

18. The method of claim 1 wherein the test compound has a beneficial effect on blood vessel formation.

19. The method of claim 17 wherein the test compound has a detrimental effect on blood vessel formation.

20. The method of claim 17 wherein the test compound is a gene product.

21. A method of evaluating the effect of a test gene product on blood vessel formation comprising the step of:

a) obtaining mesenchymal cells that express a specific test gene product;

b) forming a transgenic allantois comprising the mesenchymal cells, wherein the test gene product is expressed; and

c) observing the effect of the test gene product on vasculogenesis in the transgenic allantois.

22. The method of claim 20 wherein the test gene product is beneficial to vasculogenesis.

23. The method of claim 20 wherein the test gene product is detrimental to vasculogenesis.

ADD A'

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